



Brindisi, September the 26th, 2006

SUBJECT:

Program AMSII-UPPER TOF

**PROCESSES & MANUFACTURING DESCRIPTION
OF VARIOUS
METALLIC AND COMPOSITES PARTS/ASSY**

CONTENT

1. Scope of the Document
2. List of the main Components/Assy and related Drawings
3. Description of the Manufacturing Processes
4. Certifications of Compliance(CoC) in Attachments

1. Scope of the Document

Scope of the present Document is the description of the Manufacturing Process of various Components/Assy made of composite and metallic materials, related to the AMSII UPPER TOF.

For all the Components/Assy, the Manufacturing Process include mainly:

- Purchasing of raw material according the Drawings
- Tooling Design
- Tooling Fabrication
- Work-Cycle-Manufacturing
- Checking & Parts Identification

2. List of the main Components/Assy and related Drawings

For a complete overview, the descriptions of the Manufacturing Process are related to the following typology of Components/Assy:

- ❑ Dwg. AMS TOF 08-01 UT:Aluminium Alloy / Honeycomb Sandwich Panel Assy, which consists mainly of:
 - *Dwg. AMS TOF 08-01-001 UT, Aluminium Honeycomb High Density, thickness 100,00mm (perforated) – Two panels of thickness 50,00, bonded in autoclave using structural film adhesive- supported by glass scrim open weave;*
 - *Dwg. AMS TOF 08-01-002 UT, Skin 3 made of Al 2024T81, thickness 0,50 mm;*
 - *Dwg. AMS TOF 08-01-003 UT, Skin 4 made of Al 2024T81, thickness 0,50 mm;*
 - *Dwg. AMS TOF 08-01-004 UT, Internal Bracket X DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*
 - *Dwg. AMS TOF 08-01-005 UT, Internal Bracket X SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*
 - *Dwg. AMS TOF 08-01-006 UT, Internal Bracket Y DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*
 - *Dwg. AMS TOF 08-01-007 UT, Internal Bracket Y SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*
 - *Dwg. AMS TOF 08-01-008 UT, Beam X DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*
 - *Dwg. AMS TOF 08-01-009 UT, Beam X SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*
 - *Dwg. AMS TOF 08-01-010 UT, Beam Y DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*
 - *Dwg. AMS TOF 08-01-011 UT, Beam Y SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;*

- Dwg. AMS TOF 08-006 UT, Bracket DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 08-007 UT, Bracket SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 08-008 UT, Torsion Bar, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Various Epoxy/ Carbon Fibre and Aluminium inserts

Moreover, the following additional metallic components belong to the kit of the Sandwich Panel Assy:

- Dwg. AMS TOF 02-01-006 UT, Central Support A1 DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 02-01-007 UT, Central Support A1 SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 02-01-008 UT, Central Support A2 DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 02-01-009 UT, Central Support A2 SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 02-01-010 UT, Lateral Support DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 02-01-011 UT, Lateral Support SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 03-01-001 UT, Central Support D1 DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 03-01-002 UT, Central Support D1 SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 03-01-003 UT, External Support DX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;
- Dwg. AMS TOF 03-01-004 UT, External Support SX, made of AL 7075/T7351 or equivalent to QQ-A-250/12;

☐ Dwg. AMS TOF 05-01 LT/UT: Assy Honeycomb Infer. PMT, which consists of:

- Dwg. AMS TOF 05-01-001 LT/UT, Honeycomb Infer. PMT;
- Dwg. AMS TOF 05-01-003 LT/UT, Sheet Honeycomb Infer. PMT, made of Carbon/ Epoxy;

☐ Dwg. AMS TOF 05-02 LT/UT: Assy Honeycomb Super. PMT, which consists of:

- Dwg. AMS TOF 05-02-001 LT/UT, Honeycomb Super. PMT;
- Dwg. AMS TOF 05-02-002 LT/UT, Sheet Honeycomb Super. PMT, made of Carbon/ Epoxy;

☐ Dwg. AMS TOF 01-02-001 LT/UT: Support (Inferior) made of Epoxy/Carbon Fiber.

☐ Dwg. AMS TOF 01-02-002 LT/UT: Support (Superior) made of Epoxy/Carbon Fiber.

- ❑ Covers made of Epoxy/Carbon Fibre, having 50-100 micron Aluminium liners, internally and externally, according the Drawings below:

- *Dwg. AMS TOF 09-001- UT, Cover Inf. 1 Plane X*
- *Dwg. AMS TOF 09-002- UT, Cover Inf. 2 Plane X*
- *Dwg. AMS TOF 09-003- UT, Cover Sup. Plane X*
- *Dwg. AMS TOF 10-001- UT, Cover Inf. 1 Plane Y*
- *Dwg. AMS TOF 10-002- UT, Cover Inf. 2 Plane Y*
- *Dwg. AMS TOF 10-003- UT, Cover Sup. Plane Y*

- ❑ Ribs, Plates and Reinforcement/Supports made of Epoxy/Carbon Fibre in solid laminates, having 50-100 micron Aluminium liners, internally and externally, according the followings drawings:

- *Dwg. AMS TOF 02-01-001- UT, Central Plate PMT X*
- *Dwg. AMS TOF 02-01-002- UT, Lateral Plate A DX*
- *Dwg. AMS TOF 02-01-003- UT, Lateral Plate A SX*
- *Dwg. AMS TOF 02-01-004- UT, Lateral Plate B DX*
- *Dwg. AMS TOF 02-01-005- UT, Lateral Plate B SX*
- *Dwg. AMS TOF 03-02-001- UT, Reinforcement Box DX-SX*
- *Dwg. AMS TOF 03-02-002- UT, Reinforcement Central Box*
- *Dwg. AMS TOF 05-05-001- UT, Vertical Rib DX*
- *Dwg. AMS TOF 05-05-002- UT, Vertical Rib SX*
- *Dwg. AMS TOF 05-05-003- LT/UT, Reinforcement Honey/Honey DX*
- *Dwg. AMS TOF 05-05-004- LT/UT, Reinforcement Honey/Honey SX*
- *Dwg. AMS TOF 05-05-005- UT, Reinforcement Box Honey DX*
- *Dwg. AMS TOF 05-05-006- UT, Reinforcement Box Honey SX*
- *Dwg. AMS TOF 05-05-007- LT/UT, Support Honey Inf.*
- *Dwg. AMS TOF 05-05-008- LT/UT, Support Honey Sup.*

3. Descriptions of the Manufacturing Processes

The descriptions of the Manufacturing Processes are related to each typology of Components/Assy, as indicated on the previous point 2.

❑ **Dwg. AMS TOF 08-01 UT: Aluminium Alloy / Honeycomb Sandwich Panel Assy**

Considering all the constituents of the Aluminium Alloy / Honeycomb Sandwich Panel Assy, the Manufacturing steps have been followed as below:

1st STEP

1. Preparation, cutting of metallic exagonal honeycomb, perforated, aerospace grade, high density;
2. Bonding of the two panels of thickness 50mm, using structural epoxy adhesive film, supported with an open-mesh glass scrim, through autoclave process, 90 min. at 125°C, under vacuum + 3 bars positive pressure.
3. NC machining, on both side of the Honeycomb assy, routing the inserts holes;
4. NC machining on both side of the Honeycomb Assy, which permitted the location of reinforcement, inserts, etc.

2nd STEP

5. Preparation, trimming, drilling and cutting by NC of the Al skins and reinforcement;
6. Preparation of all the inserts, metallic and in epoxy/carbon fibre;
7. Cleaning of the component with MEK (methylethylketone);

3rd STEP

All the metallic components made of Al Alloy 7075/T7351 or equivalent to QQ-A-250/12 as listed above have been manufactured following the steps below:

8. Processing the CATIA models, for each component;
9. Programming
10. CNC machining
11. Finishing
12. Dimensional checking
13. Penetrant Liquid Inspection
14. Protection through the application of Alodine, according the drawings

4th STEP

15. Preassembly all the components indicated in the previous steps 1, 2, 3.
16. Dimensional checking, visual inspection
17. Bonding all the components, Honeycomb/Skins/ Metallic parts, reinforcement and insert, using structural film adhesive, in autoclave: cure by 125°C for 90 minutes , under vacuum bag, applying 3 bars positive pressure ;
18. Cooling at room temperature and demoulding of the panel assy;
19. Cleaning, visual inspection, tap testing;
20. Dimensional control
21. Finishing.

- ☐ **Dwg. AMS TOF 05-01 LT/UT: Assy Honeycomb Inf. PMT, and**
- ☐ **Dwg. AMS TOF 05-02 LT/UT: Assy Honeycomb Super. PMT**

The Honeycomb/Assy above mentioned have been produced using appropriated tooling, following the works steps as below:

- a. Preparation of the tooling, liquid release application;
- b. Preparation of the Honeycomb
- c. Inserts positioning
- d. Cutting of kit epoxy/carbon fibre prepreg, style Plain Weave, 200 gr. per square meter dry fibre;
- e. Lamination, lay up;
- f. Vacuum bagging;
- g. Cure in autoclave, by 125°C for 90 minutes, 5 bars pressure;
- h. Demoulding at room temperature;
- i. Trimming, drilling and cleaning in MEK
- j. Checking according the drawing.

- ☐ **Dwg. AMS TOF 01-02-001 LT/UT: Support (Inferior) and**
- ☐ **Dwg. AMS TOF 01-02-002 LT/UT: Support (Superior), both made of Epoxy/Carbon Fiber.**

The Supports above mentioned have been produced using appropriated tooling, designed in order to obtain 20 pieces of both types in one autoclave cure, following the works steps as below:

- k. Preparation of the tooling, liquid release application;
- l. Cutting of kit epoxy/carbon fibre prepreg, style Plain Weave, 200 gr. per square meter dry fibre;
- m. Lamination, lay up;
- n. Vacuum bagging;
- o. Cure in autoclave, by 125°C for 90 minutes, 5 bars pressure;
- p. Demoulding at room temperature;
- q. Trimming, drilling and cleaning in MEK.
- r. Checking according the drawing.

❑ **Covers made of Epoxy/Carbon Fibre, having 50-100 micron Aluminium liners, internally and externally:**

The Covers as listed and the related point above have been manufactured through the following work steps:

- a. Preparing of the dedicated lay up molds;
- b. Liquid release application;
- c. Lamination – Lay up of epoxy carbon fibre prepreg, style Plain weave, 200 gr/sqm dry fibre;
- d. Vacuum bagging;
- e. Cure in autoclave by 125°C, 90 minutes, 3 bars positive pressure;
- f. Demoulding
- g. Application of 100 microns aluminium liners, internally and externally;
- h. Bonding of the aluminium liners in oven, by 80°C, under vacuum bag (700 mmHg);
- i. Trimming and drilling by CNC program;
- j. Checking in compliance with the drawings.

❑ **Ribs, Plates and Reinforcement/Supports made of Epoxy/Carbon Fibre in solid laminates, having 50-100 micron Aluminium liners, internally and externally**

The above components have been realized through the following main work steps, in appropriated tooling, designed respecting each drawing of the components:

- a. Tooling preparation – release application;
- b. Raw material preparation;
- c. Lamination;
- d. Cure in autoclave by 125°C, under vacuum bags, 3 bars positive pressure;
- e. Demoulding;
- f. Trimming and Drilling using CNC machine;
- g. Checking according the related drawings.

4. Certifications of Compliance(CoC) in Attachments

Certification of Compliance (CoC) of each raw material used, also special processes likes “Liquid Penetrant Inspection” and Alodine surface treatment have been attached on the present document; precisely for:

- Low density metallic Honeycomb;
- High density metallic Honeycomb;
- Aluminium skins and reinforcement;
- Structural Adhesive Film;
- Epoxy Carbon Prepreg;
- Aluminium Alloy 7075T7351 for machined parts;
- Liquid Penetrant Inspection
- Alodine surface treatment

ATTACHMENT 1:	SP Epoxy Carbon Fabric
ATTACHMENT 2:	SP Epoxy Carbon Fabric
ATTACHMENT 3:	SP Epoxy Carbon Fabric
ATTACHMENT 4:	SP Epoxy Carbon Fabric
ATTACHMENT 5:	3M Film Adhesive
ATTACHMENT 6:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 7:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 8:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 9:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 10:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 11:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 12:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 13:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 14:	AVIOMETAL ALUMINIUM ALLOY 7075T7351
ATTACHMENT 15:	HONEYCOMB & DERIVATI
ATTACHMENT 16:	HONEYCOMB & DERIVATI

SP SYSTEMS QUALITY CONTROL TEST REPORT

PRODUCT TYPE: SE84LV/RC200T/1000mm/42%+/-3%

Customer:

F.lli Mugnaini Srl



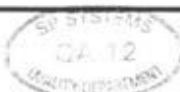
SP Systems

Composite
Engineering
Materials

Customer Order No.	16-2004	SP Order No.:	2000037390	
Date of Shipment	07-May-04	REINFORCEMENT		
Despatch Note No.	D/2000037390	Material	Type	Wt (g/m2)
Test Report No.	3341	CARBON	RC200T	194

Batch No.	Roll No.	Pre-Preg Weight (g/m2)	Fibre Weight (g/m2)	Resin Content (%)	Enthalpy (J/g)	Date of Manufacture	Roll Quantity (lm)	Roll Quantity (m²)
092190	10	330	196	40.61%	355	30-Apr-04	51.0	51.0
092190	11	327	196	40.06%	355		50.0	50.0
092190	13	329	196	40.43%	355		50.0	50.0
092190	14	332	196	40.96%	355		50.5	50.5
092190	15	329	196	40.43%	355		50.0	50.0
092190	16	327	196	40.06%	355		51.0	51.0

All the above listed material batches are certified to meet the mechanical property requirements specified by the Material Data Sheets.

Compiled By: *Steve White* Checked By:

S P Systems Pre-preg Unit

QUALITY CONTROL TEST REPORT

Customer	F.Ili Mugnaini srl	
Customer Order No.	16-2004	
SP Systems Order No.	2000037390	
SP Systems Product Code	PC13-1728	
Test Report No.	3341	Page No. 1 of 3 pages



SP Systems
Composite
Engineering
Materials

ISSUED BY: PREPREG QUALITY CONTROL DEPARTMENT

DATE OF ISSUE: 16-2004

FIBRE/FABRIC TEST RESULT DATA

Prepreg Batch No.	Fibre Type	Fibre Batch No.
092190	High Strength Carbon	412761, 412762

Please note that the information contained in this test report for the above product code pertains solely to the material contained on the Certificate of Conformity bearing the same SP Systems order number as shown above.

All the above listed material batches are certified to meet the property requirements specified by the Material Data Sheets.

COMPILED BY

Steve White

QUALITY STAMP



Please note that the information contained in this test report for the above product code pertains solely to the material contained on the Certificate of Conformity bearing the same SP Systems order number as shown above.



Carbon Fibre Test Results

Report No: 3341

Fibre Type: High Strength Carbon

Filament No: 3,000

Test Results[†]:

Batch No.	Strength GPa	Modulus GPa	Mass per Unit Length mg/m	Fibre Density g/cm ³	Size Content % by Mass
412761	3.71	232	199	1.76	1.20

[†] These results were not obtained by SP Systems, but were provided by the original manufacturer of the fibre who have certified that they were obtained in accordance with agreed specifications.

Signed: *Gene White*



For and on behalf of SP Systems



Carbon Fibre Test Results

Report No: 3341

Fibre Type: High Strength Carbon

Filament No: 3,000

Test Results[†]:

Batch No.	Strength GPa	Modulus GPa	Mass per Unit Length mg/m	Fibre Density g/cm ³	Size Content % by Mass
412762	3.79	234	199	1.76	1.10

[†] These results were not obtained by SP Systems, but were provided by the original manufacturer of the fibre who have certified that they were obtained in accordance with agreed specifications.

Signed: *Steve White* A circular stamp with the text 'SP SYSTEMS' at the top, 'QA 12' in the center, and 'QUALITY DEPARTMENT' at the bottom.

For and on behalf of SP Systems

3M
Scotch-Weld™
Structural Adhesive Film

Certified Of Compliance

PRODUCT: AF163-2 Structural Adhesive Film

Batch: Sampling – No Charge
Lot: Sampling – No Charge
Date of Mfg: Sept. 04
Expiration: Sept. 05

Test Data

<u>Spec.</u>	<u>Test Descript.</u>	<u>Test Temper.</u>	<u>Average Value</u>
MMM-A-132	Lap Shear	75°F	4880 psi
	Lap Shear	180°F	3098 psi
	Lap Shear	-67°F	5224 psi
MIL-A-25463	Sandwich Peel	75°F	26.2 in*lb/inc
	Sandwich Peel	180°F	22.8 in*lb/inc
	Sandwich Peel	-67°F	26.0 in*lb/inc
MIL-A-25463	Flatwise T.S.	75°F	1377 psi
	Flatwise T.S.	180°F	725 psi
	Flatwise T.S.	-67°F	1804 psi

 Quality Ass.

Sept. 04



21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
CAPITALE SOCIALE: € 516.400,00 int.versato
CODICE FISCALE E PARTITA IVA 02411130129
REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
VIA CROCEFISSO, 76
84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022362 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
Purchase Order

Si attesta che il seguente materiale: ERGAL 7075/T7351
We hereby state that the following material: 45 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
and with the Customer Specification:

Numero di Partita D021701 Colata
Batch No. Cast No.

Analisi Chimica: - - -
Chemical Composition:

Prove Meccaniche: - - -
Mechanical tests:

AVIOMETAL S.p.A.
Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITÀ
CERTIFICATO DA DNV
=UNI EN ISO 9001/2000=



21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
CAPITALE SOCIALE : € 516.400,00 int.versato
CODICE FISCALE E PARTITA IVA 02411130129
REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
VIA CROCEFISSO, 76
84012 ANGRI

SA

Arsago Seprio, lì 18/11/04

Certificato di Conformita' No. 0022363 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
Purchase Order

Si attesta che il seguente materiale: ERGAL 7075/T7351
We hereby state that the following material: 15 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
and with the Customer Specification:

Numero di Partita D204801 Colata
Batch No. Cast No.

Analisi Chimica: - - -
Chemical Composition:

Prove Meccaniche: - - -
Mechanical tests:

AVIOMETAL S.p.A.
Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITÀ
CERTIFICATO DA DNV
=UNI EN ISO 9001/2000=



21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
CAPITALE SOCIALE : € 516.400,00 int.versato
CODICE FISCALE E PARTITA IVA 02411130129
REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
VIA CROCEFISSO, 76
84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022364 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
Purchase Order

Si attesta che il seguente materiale:
We hereby state that the following material:

ER GAL 7075/T7351
20 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905
listed on the shipping report No.

Del 18/11/04
Dated

è conforme alle seguenti norme di riferimento:
complies with the following reference Specifications:

EN 485/573/754/755

ove applicabile
as applicable

e alla Specifica del Cliente:
and with the Customer Specification:

Numero di Partita E217901
Batch No.

Colata
Cast No.

Analisi Chimica: - - -
Chemical Composition:

Prove Meccaniche: - - -
Mechanical tests:

AVIOMETAL S.p.A.
Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITA'
CERTIFICATO DA DNV
=UNI EN ISO 9001/2000=



21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
CAPITALE SOCIALE : € 516.400,00 int.versato
CODICE FISCALE E PARTITA IVA 02411130129
REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
VIA CROCEFISSO, 76
84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022365 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
Purchase Order

Si attesta che il seguente materiale: ERGAL 7075/T7351
We hereby state that the following material: 80 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
and with the Customer Specification:

Numero di Partita E266301 Colata
Batch No. Cast No.

Analisi Chimica: - - -
Chemical Composition:

Prove Meccaniche: - - -
Mechanical tests:

AVIOMETAL S.p.A.
Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITÀ
CERTIFICATO DA DNV
=UNI EN ISO 9001/2000=



S.p.A.

21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
 TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
 www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
 CAPITALE SOCIALE: € 516.400,00 int.versato
 CODICE FISCALE E PARTITA IVA 02411130129
 REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
 Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
 NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
 VIA CROCEFISSO, 76
 84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022366 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
 Purchase Order

Si attesta che il seguente materiale: ERGAL 7075/T7351
 We hereby state that the following material: 30 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
 listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
 complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
 and with the Customer Specification:

Numero di Partita D197202 Colata
 Batch No. Cast No.

Analisi Chimica: - - -
 Chemical Composition:

Prove Meccaniche: - - -
 Mechanical tests:

AVIOMETAL S.p.A.
 Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITÀ
 CERTIFICATO DA DNV
 =UNI EN ISO 9001/2000=



S.p.A.

21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
 TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
 www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
 CAPITALE SOCIALE : € 516.400,00 int.versato
 CODICE FISCALE E PARTITA IVA 02411130129
 REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
 Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
 NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
 VIA CROCEFISSO, 76
 84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022367 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
 Purchase Order

Si attesta che il seguente materiale: ERGAL 7075/T7351
 We hereby state that the following material: 35 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
 listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
 complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
 and with the Customer Specification:

Numero di Partita E115101 Colata
 Batch No. Cast No.

Analisi Chimica: - - -
 Chemical Composition:

Prove Meccaniche: - - -
 Mechanical tests:

AVIOMETAL S.p.A.
 Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITÀ
 CERTIFICATO DA DNV
 =UNI EN ISO 9001/2000=



S.p.A.

21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
 TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
 www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
 CAPITALE SOCIALE : € 516.400,00 int.versato
 CODICE FISCALE E PARTITA IVA 02411130129
 REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
 Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
 NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
 VIA CROCEFISSO, 76
 84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022368 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
 Purchase Order

Si attesta che il seguente materiale: ERGAL 7075/T7351
 We hereby state that the following material: 40 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
 listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
 complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
 and with the Customer Specification:

Numero di Partita E173801 Colata
 Batch No. Cast No.

Analisi Chimica: - - -
 Chemical Composition:

Prove Meccaniche: - - -
 Mechanical tests:

AVIOMETAL S.p.A.
 Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITA'
 CERTIFICATO DA DNV
 =UNI EN ISO 9001/2000=



S.p.A.

21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
CAPITALE SOCIALE : € 516.400,00 int.versato
CODICE FISCALE E PARTITA IVA 02411130129
REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014
Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
VIA CROCEFISSO, 76
84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022371 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
Purchase Order

Si attesta che il seguente materiale: AVIONAL 2024T3 - TRATT. TERMICO T81
We hereby state that the following material: 15x60 PIATTO

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
and with the Customer Specification:

Numero di Partita E354801 Colata
Batch No. Cast No.

Analisi Chimica: - - -
Chemical Composition:

Prove Meccaniche: - - -
Mechanical tests:

AVIOMETAL S.p.A.
Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITA'
CERTIFICATO DA DNV
=UNI EN ISO 9001/2000=



S.p.A.

21010 ARSAGO SEPRIO (VARESE) - VIA SEMPIONE, 15
TELEFONO 0331 - 279411 - TELEFAX 0331 - 279400
www.aviometal.com E Mail aviometal@aviometal.com

SOCIETA' PER AZIONI
CAPITALE SOCIALE: € 516.400,00 int.versato
CODICE FISCALE E PARTITA IVA 02411130129
REGISTRO IMPRESE DI VARESE 02411130129

Documento conforme alla Norma EN 45014

Document in accordance to EN 45014

SEMILAVORATI IN LEGHE DI ALLUMINIO, METALLI
NON FERROSI E MATERIALI AD ALTA TECNOLOGIA

SPETT.

OFFICINE PIGNATARO S.R.L.
VIA CROCEFISSO, 76
84012 ANGRI

SA

Arsago Seprio, li 18/11/04

Certificato di Conformita' No. 0022370 /C
Certificate of Conformity

Ordine di Acquisto No. ORD.103 DEL 12/11
Purchase Order

Si attesta che il seguente materiale: ERGAL 7075/T7351
We hereby state that the following material: 140 DA LAMIERA

Elencato nel Rimesso di Consegna No. 014905 Del 18/11/04
listed on the shipping report No. Dated

è conforme alle seguenti norme di riferimento: EN 485/573/754/755 ove applicabile
complies with the following reference Specifications: as applicable

e alla Specifica del Cliente:
and with the Customer Specification:

Numero di Partita D056001 Colata
Batch No. Cast No.

Analisi Chimica: - - -
Chemical Composition:

Prove Meccaniche: - - -
Mechanical tests:

AVIOMETAL S.p.A.
Serv. Controllo Qualita'

AZIENDA CON SISTEMA QUALITA'
CERTIFICATO DA DNV
=UNI EN ISO 9001/2000=



HONEYCOMB & DERIVATI

CERTIFICATE OF CONFORMITY REF.N° 172

Customer RAV SRL

Recipient RAV SRL

Order Ref. 121/04

Confir. n° 40508

WE CERTIFY THAT THE PRODUCT DETAILED HEREWITH:

HONEYCOMB ALLUMINIUM ALLOY - CR III P TREATMENT

Alloy 3003

Type Cell size 1/4 Nom. foil .0025 P Density 5.2

Cut Thickness mm. 50,00

Expanded fit for L mm. 1250 W mm. 2500

Pcs n° 1

that we send with doc. n° 466 of 10/12/2004 item# 1

HAS BEEN MANUFACTURED FROM A BLOCK CERTIFIED BY THE PRODUCER
 - Original Certificate is preserved c/o our Quality Control Service -

Slicing to thickness and expansion have been made in accordance with the I.MA.TEC. Srl
 Quality control manual.

Quality Control Visa

RR
 Milano, 10/12/2004

I.MA.TEC. IMPIANTI MATERIALI & TECNOLOGIA srl
 20157 MILANO - VIA G. STEPHENSON n° 74 -
 Tel. + 39 02 39 002 168 Fax + 39 - 02 39 001 068



HONEYCOMB & DERIVATI

CERTIFICATE OF CONFORMITY REF. N° 173

Customer RAV SRLRecipient RAV SRLOrder Ref. 121/04Confir. n° 40508

WE CERTIFY THAT THE PRODUCT DETAILED HEREWITH:

HONEYCOMB ALLUMINIUM ALLOY - CR III P TREATMENT

Alloy 5052Type Cell size 3/16 Nom. foil .001 P Density 3,1Cut Thickness mm. 50,00Expanded fit for L mm. 1250 W mm. 2500Pcs n° 1that we send with doc. n° 466 of 10/12/2004 item# 2

HAS BEEN MANUFACTURED FROM A BLOCK CERTIFIED BY THE PRODUCER

- Original Certificate is preserved c/o our Quality Control Service -

Slicing to thickness and expansion have been made in accordance with the I.MA.TEC. Srl Quality control manual.

Quality Control Visa

Milano, 10/12/2004

I.MA.TEC. IMPIANTI MATERIALI & TECNOLOGIA srl
 20157 MILANO - VIA G. STEPHENSON n° 74 -
 Tel. + 39 02 39 002 168 Fax + 39 - 02 39 001 068